



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Nuclear Energy University Programs (NEUP) Fiscal Year (FY) 2015 Annual Planning Webinar

IRP-FC-3: Cask Condition Evaluation Techniques

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IRP-FC-3: Cask Condition Evaluation Techniques

■ Introduction

- Many types and designs of spent nuclear fuel casks and containers currently in storage
- Inventory of spent fuel in these casks/containers is large and with varying burn-up rates and out-of-reactor times and they have multiple internal components
- Long-term internal stability of the internals and spent fuel and its cladding is important to maintain sub-criticality
- The challenge is to assess the condition of the internals and the spent nuclear fuel non-intrusively after prolonged storage periods
- This topic addresses the development of innovative technologies to determine and catalogue the extent of any damage or degradation of internal components from prolonged storage or handling



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■ Background

- **Non-destructive examination techniques currently in use where surface damage and in some cases volumetric assessments can be performed on a reasonable scale on concrete or metal components**
- **Technology limited with layered and inaccessible components with different materials and varying gaps between the layers**
- **Needed are fundamental technologies to discern the condition of the internals of a spent fuel storage cask/container and its components after prolonged storage with a high degree of reliability**



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- **Objective:**
- **New technology/technologies to support the design of simplified tools that can be used for assessing, cataloguing, sorting and isolating any operationally degraded casks/canisters**



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- **Work to be Performed:**
- **Innovative methodology development**
- **Proof of principle evaluation**
- **Identify and quantify inherent uncertainties**
- **Develop and implement a “mock-up” test program**
- **Conduct tests**
- **Assemble a system for field demonstration**
- **Conduct a field demonstration**
- **Prepare a detailed final report**



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- **Tasks to be Performed**
- **Task 1: Development of an integrated plan, technology development and testing – at 3 months**
- **Task 2: Methodology development – at 9 months**
- **Task 3: Proof of principle testing and uncertainty evaluation – at 15 months**
- **Task 4: Develop and implement “mock-up” tests – at 26 months**
- **Task 5: Field demonstration – at 33 months**
- **Task 6: Complete project report – at 36 months**



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- **Deliverables**
- **Periodic progress reports – every 6 months;**
- **Technology assessment report – 18 months after beginning of performance period;**
- **Final project report – 36 months after beginning of performance period**